

Notes on Artificial and Bio General Intelligence

Gregor Mobius

It seems that the four key properties of life: metabolism, replication, observation and memory could be interpreted through the observer-observed relationship. In fact metabolism relates to observation and replication relates to memory. While metabolism and observation are exchanges/interactions with the environment (inside-outside), replications and memory are processes within the living being(observer) itself (inside-inside). However, both these relationships, external and internal, form “pictures of the world” impressed into the living being (from DNA to Biosphere), which are being continuously updated throughout its life . Without the observer there is no observed. Without life there is no world. Without the living there is no non-living matter.

There is a possibility that, at some “bio-singularity“ point, something we could call Bio General Intelligence (BGI) will emerge and become a living alternative to Artificial General Intelligence (AGI). In essence it will be a relationship without precedent between the living and non-living matter on the largest scale, which might raise the question: could the properties which have so far been specific only to living matter (intelligence, consciousness, self-awareness, self-initiative, self-reflection, curiosity) be extended to non-living matter as well, not to mention feelings like happiness, fear, empathy, intuition, anger... Would, for example, AGI be able to recognize its reflection in a pool of water surface, or a mirror or recognize itself a picture? Perhaps in the case of such a non-living entity it would make more sense to use the term “algorithm” instead of “intelligence”.

The question is, if the Biosphere ever emerged as a single being, what would its main properties be? Would it be able to “see” the world only from the inside out, or it might it became capable of perceiving itself from the outside as well? In addition to having a certain degree of living intelligence, it is possible that, when it becomes aware of its own existence (self-awareness), it would acquire a capacity to see itself, not only from within, but from

without as well. This process was already set in motion some decades ago when several humans first saw the Earth from space and from the Moon, thus enabling the Biosphere to see itself from the outside as a whole. Another possible option would be a view of some non-organic(AI) observer, or some alien, non-DNA based, life form.

All living organisms on Earth are surrounded by non-living and living matter, except for the Biosphere which has so far been surrounded only by non-living matter with the exception of temporary excursions of its living elements into Space organized by humans.

Without nature there is no culture. Although everything known in nature is named and structured by (human)culture, culture is in fact just one of many expressions of nature. We might consider placing life as the most general concept from which we derive everything, including the notion of the Universe, and the Biosphere would be its most complex earthly expression. Notions and phenomena known as art, science, religion, sport, technology, politics, would be expressions of life and parts of the Biosphere. Everything made by humans: cities, roads, factories, electric plants, machines, internet, artificial intelligence, governments, military, universities, museums, are products of living matter, and thus an integral part of the Biosphere as well. This includes various concepts of structuring time, (cyclical-linear) and two main types of change in its foundation: day-night (divided into morning, afternoon, evening, night), and four annual seasons. Other time divisions (chronology): hours, weeks, months, years are derived from these two.

The existence of any living organization, a single cell, a complex organism, an ecosystem, a society, or the entire Biosphere, is based on two opposite requirements: stability and change. They need to be properly balanced, since an emphasis on stability would lead to conservation and death, while tilting toward uncontrolled change could lead to chaos and again to death.

However, on the individual level the key question is the end of life (death). It seems there is no good narrative in which death of an individual would become meaningful and acceptable like in previous attempts such as resurrection/ reincarnation in religion or posterity in history. Biologically it is understandable that what is born at some point has to die. In that sense there is no difference between bacteria and humans. On that level the only purpose of life is for an organism to survive as long as possible, to experience the world and to pass its properties to its offspring. But, is there perhaps something more than that, especially in the case of humans? There are so many things humans do that seem to have no direct relationship to their biological survival.

Existential human transactions with the environment (metabolism) are: breathing and digesting. The space inside our bronchi, bladder and intestines is outside, it is where the exchange with the external world takes place. From non-existence we came to existence, and from existence we will go back to non-existence (non-living - living - non-living). Thus the

two key events for an individual are birth and death. However, since no one has pre-birth memories, the anticipation of death becomes the main notion of life/existence. First, there is an instinctive fear of death as such. Then, among conscious beings there is a sadness of realization that, not only individual but all life will eventually come to an end. That will be eternity, the end of everything.

When for example, a certain ribonucleic acid(RNA) polymerase “decides” it needs to make an messenger RNA(mRNA), how does it “know” where to go on its way to the deoxyribonucleic acid(DNA), how to find the exact sequence it needs to copy when it gets there? Does it sends a signal to the DNA to open that exact section, or does the DNA already “know” where to open? Then RNA polymerase approaches the right strand, parks on the section that becomes available, and begins making a copy. Just this detail, how copying info from DNA to mRNA takes place, is a mystery in itself. As if one living being(DNA) is handing over a codon, base by base, to another living being(mRNA) who decides when the transfer was completed and, with this “truckload of goods”, leaves the DNA and takes a journey to the ribosome. But how does the mRNA know where the ribosome is and what is the best way to get there?. When it gets to the ribosome, it knows how to approach it from the correct side, then it enters the ribosome and enables it to copy the sequence it took from the DNA, and turn it into a protein necessary for a cell to function and stay alive. And all this is just a tiny detail in the complex processes taking place within a single cell every second, minute, hour, day...If a cell is a living entity, what about its parts: mRNA, ribosome, DNA - are those components of a cell also alive? If not, how can we explain their deliberate behavior, their knowledge, even their initiative? How do they know what to do, how to do it and when and where to go to do it and, finally, how do they decide to do it? In a way I see myself as some kind of mRNA playing a tiny role within a much larger and complex conscious living being, without really knowing if the “role” is more than development and expansion of life. However, unlike the mRNA or ribosomes, humans would be conscious beings themselves within another conscious being (if we are not already), but what kind of consequences this will have is yet to be seen.

When and how, under what conditions, does non-living matter become alive? Below what order of magnitude is living matter not possible? What about the “proton motive force” that is maintaining life in all living cells? Are protons (and electrons) taking part in these processes non-living or living? These questions of countless relationships between living and non-living matter will be probably redefined with a new layer on the macro level, with the emergence of the Bio General Intelligence as a single largest conscious living entity and non-living Artificial General Intelligence if and when it ever appears as an independent entity. Whatever the future brings, it seems that in the case of the emergence of Bio General Intelligence and/or Artificial General Intelligence the key role(s) will be played by humans.